

CLAIMS

1. A method for generating a gene library from an environmental pool of microorganisms, which gene library is enriched in DNA encoding a polypeptide with an activity of 5 interest, which method comprises:
 - a) subjecting the environmental pool of microorganisms to cultivation under conditions wherein the pool of microorganisms is enriched in microorganisms harbouring said DNA, thereby forming an enriched environmental pool of microorganisms, and
 - 10 b) preparing a gene library from the enriched environmental pool of microorganisms, wherein prior to said preparing there is no further purification of the enriched environmental pool of microorganisms.
- 15 2. The method of claim 1, wherein the conditions are culturing in a medium that contains a substrate for the polypeptide with an activity of interest encoded by said DNA.
3. The method of claim 2, wherein the substrate constitutes 20 the carbon source and/or nitrogen source of the medium.
4. The method of claim 2, wherein the substrate comprises pectin, amylose, cellulose, galactose, xylose or arabinose or a combination thereof.
- 25 5. The method of claim 1, wherein the pool of microorganisms is enriched by one or more growth restrictions.
6. The method of claim 5, wherein the growth restrictions 30 comprise pH and temperature.
7. The method of claim 5, wherein the growth restrictions are pH 9-11 and temperature 50-70°C.
- 35 8. The method of claim 1, wherein the gene library is enriched in DNA encoding an enzyme of interest.

9. The method of claim 8, wherein the enzyme of interest comprises a hydrolase, an oxidoreductase, a transferase, a lyase or a ligase.

5 10. The method of claim 8, wherein the enzyme of interest comprises a protease, lipase, beta-galactosidase, lactase, polygalacturonase, beta-glucoamylase, esterase, hemicellulase, peroxidase, oxidase, laccase or glucose oxidase.

10 11. The method of claim 8, wherein the enzyme of interest is a pectinase, an amylase, a galactanase, an arabinase, a xylanase, or a cellulase.

12. The method of claim 1, wherein the environmental pool of 15 microorganisms comprises enzyme producing microorganisms.

13. The method of claim 1, wherein the microorganisms comprise bacteria or fungi.

20 14. A method of identifying a DNA sequence encoding a / polypeptide of interest from an environmental pool of microorganisms, which method comprises:

25 a) subjecting the environmental pool of microorganisms to cultivation under conditions wherein the pool of microorganisms is enriched in microorganisms harbouring said DNA sequence, thereby forming an enriched environmental pool of microorganisms;

30 b) producing gene libraries from the enriched environmental pool of microorganisms, wherein prior to said preparing there is no further purification of the enriched environmental pool of microorganisms, and

c) screening the libraries of step b) to identify a DNA sequence encoding the polypeptide of interest.

35 15. The method of claim 14, wherein the polypeptide of interest encodes an enzyme.

16. The method of claim 14, wherein the gene libraries are screened in step c) for an active enzyme.

17. The method of claim 14, wherein the polypeptide of interest encodes a hydrolase, an oxidoreductase, a transferase, a lyase or a ligase.

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18. The method of claim 14, wherein the polypeptide of interest encodes a protease, lipase, beta-galactosidase, lactase, polygalacturonase, beta-glucosidase, esterase, hemicellulase, peroxidase, oxidase, laccase or glucose oxidase.

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19. The method of claim 14, wherein the polypeptide of interest encodes a pectinase, an amylase, a galactanase, an arabinase, a xylanase, or a cellulase.

15 20. The method of claim 14, wherein the conditions are culturing in a medium that contains a substrate for the polypeptide with an activity of interest encoded by said DNA.